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10/597,082	05/14/2007	**Benny Pesach**	227/05282	5820

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EXAMINER	
LIU, CHU CHUAN	
ART UNIT	**PAPER NUMBER**
3777	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/597,082	PESACH, BENNY	
	Examiner	Art Unit	
	CHU CHUAN (JJ) LIU	3777	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/29/2007, 08/06/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's preliminary amendment filed on 07/11/2006 is fully considered.

Claim Objections

2. Claims 2-4, 9-10, 18 and 22 are objected to because of the following informalities: In regard to claims 2-4, 9-10, 18 and 22, the word "and" before "comprising" should be replaced by "further". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 21 recites the limitation "the mirror" in line 2. There is insufficient antecedent basis for this limitation in the claim. Examiner interprets that claim 21 is a dependent claim of claim 20 for the purpose of examination.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Oraevsky et al. (USPN 6,405,069). In regard to claim 1, Oraevsky discloses an

apparatus for stimulating photoacoustic waves in a region of a body and generating signals responsive to the stimulated photoacoustic waves (Fig. 1) comprising: a light source (pulsed laser, Fig. 1 and Col 5 line 60 – Col 6 lines 6) that provides light that stimulates photoacoustic waves in the region (Fig. 1); a light pipe (opto-acoustic prism, Fig. 1 and Col 5 line 60 – Col 6 lines 6) having an output aperture (the area between the prism and the surface, Fig. 1) and at least one input aperture (the connection area between the optical fiber and the prism, Fig. 1), which light pipe receives the light from the light source at the at least one input aperture and transmits the received light from the output aperture to illuminate the region (Fig. 1); and at least one acoustic transducer (transducer, Fig. 1) that generates signals responsive to acoustic energy from the photoacoustic waves that is incident on the optical output aperture (Fig. 1 and Col 6 lines 8-11).

In regard to claim 22, Oraevsky discloses an optical fiber (Fig. 1) that transmits the light from the light source to the input aperture (Fig. 1).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2, 4-9, 11-15, 18-19, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oraevsky as applied to claim 1 above, and further in view of

Zimmerman et al. (USPN 5,428,468). In regard to claim 2, Oraevsky discloses the apparatus comprises a prism formed in the light pipe that reflect the light propagating towards the output aperture so that it exits the light pipe through the output aperture (opto-acoustic prism, Fig. 1 and Col 5 line 60 – Col 6 lines 6). Oraevsky does not specifically disclose the apparatus comprises microprisms. Zimmerman teaches an apparatus (illumination system, title) comprises microprisms (title; element 28, Figs. 1, 1A, 1B, 2, and 2A). The opto-acoustic prism taught by Oraevsky operates as a reflector/ refractor to direct the incident light from the optical fiber to the surface of the target. Zimmerman teaches an alternative/ equivalent illumination system for directing incident lights from the side of the device to the emitting surface perpendicularly and uniformly (Fig. 2). Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention was made to substitute the prism (Oraevsky) with the illumination system (Zimmerman) to yield predictable results.

In regard to claim 4, Oraevsky as modified by Zimmerman discloses the apparatus comprises a holographic lens (elements 80, Fig. 2 of Zimmerman) formed at the output aperture that receives light incident on the output aperture and directs the received light so that it exits the light pipe from the output aperture (Fig. 1 of Oraevsky and Fig. 2 of Zimmerman).

In regard to claim 5, Oraevsky as modified by Zimmerman discloses the holographic lens configures the exiting light into a light beam having a desired shape (perpendicular to the emitting surface, Fig. 2 of Zimmerman).

In regard to claim 6, Oraevsky as modified by Zimmerman discloses the light beam is configured by the holographic lens into a substantially cylindrical light beam (Fig. 2 and Col 6 lines 44-57 of Zimmerman. The symmetric configuration of the microlens 80 will direct incident light beams to a substantially cylindrical shape).

In regard to claim 7, Oraevsky as modified by Zimmerman discloses the intensity of light in the light beam is substantially constant over the cross section of the light beam (Fig. 2 and Col 6 lines 55-57 of Zimmerman).

In regard to claim 8, Oraevsky as modified by Zimmerman discloses the intensity of light in the light beam varies harmonically over the cross section (the light intensity will vary harmonically over the cross section parallel to the emitting surface according to the input intensity of the pulsed laser, Fig. 1 of Oraevsky and Fig. 2 of Zimmerman).

In regard to claim 9, Oraevsky discloses all the claim limitations except the apparatus comprises a holographic lens formed at the at least one input aperture that directs light received at the input aperture towards the output aperture. Zimmerman teaches an illumination system comprising a holographic lens (microlenses 80, Fig. 2) for directing the incident light beams to the microlenses on emitting surface and providing perpendicular illumination to the target. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention was made to modify the input aperture (Oraevsky) to incorporate the illumination system (Zimmerman) in order to more evenly directing the incident light beams perpendicular to the surface of the target.

In regard to claim 11, Oraevsky as modified by Zimmerman discloses the light pipe is planar (Fig. 2 of Zimmerman), having relatively large parallel face surfaces (horizontal surface of element 82, Fig. 2 of Zimmerman) and a relatively narrow edge surface (elements 17 and 18, Fig. 2 of Zimmerman).

In regard to claim 12, Oraevsky as modified by Zimmerman discloses the light received from the light source (optical fiber, Fig. 1 of Oraevsky) propagates from the input aperture towards the output aperture along a direction parallel to the plane of the light pipe (the light will travel parallel to the surface of element 16, Fig. 2 of Zimmerman).

In regard to claim 13, Oraevsky as modified by Zimmerman discloses an input aperture (element 17, Fig. 2 of Zimmerman). Oraevsky as modified by Zimmerman does not specifically disclose at least one input aperture is located on a face surface of the light pipe. Zimmerman teaches the waveguide 16 is made from any transparent material such as glass or polymer (Col 4 lines 9-10 and lines 22-23 of Zimmerman). The aperture which is located at the surface 17 or at the bottom surface of 16 will be equivalent. Therefore, It would have been obvious to one with ordinary skill in the art at the time of the invention was made to substitute the location of the aperture to the at the bottom surface to yield predictable results.

In regard to claim 14, Oraevsky as modified by Zimmerman discloses an input aperture of the at least one input aperture is located on an edge surface of the light pipe (element 17, Fig. 2 of Zimmerman).

In regard to claim 15, Oraevsky as modified by Zimmerman discloses the at least one transducer comprises at least one transducer mounted on a face surface of the light pipe (Fig. 1 of Oraevsky) and wherein acoustic energy incident on the output aperture is incident on the at least one transducer after propagating through the light pipe along a direction substantially perpendicular to the face surfaces (Fig. 1 of Oraevsky).

In regard to claim 18, Oraevsky as modified by Zimmerman discloses the apparatus comprises input optics controllable to change a direction from which light from the light source is incident on the input aperture (angle φ, Fig. 1A and Col 5 lines 54-60 of Zimmerman. The direction can be changed by replacing microlenses with different tile angles).

In regard to claim 19, Oraevsky as modified by Zimmerman discloses a direction along which light that enters the light pipe from the light source exits the output aperture is responsive to the direction from which the light is incident on the input aperture (The directed light beams are responsive to the incident light, Fig. 1 of Oraevsky and Fig. 2 of Zimmerman).

In regard to claim 23, Oraevsky as modified by Zimmerman discloses an end of the optical fiber is bonded to an input aperture of the at least one input aperture (Fig. 1 of Oraevsky).

9. Claims 3, 10, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oraevsky as applied to claim 1 above, and further in view of Varasi et al. (USPN 5,493,390). In regard to claim 3, Oraevsky discloses all the claim limitations except the

apparatus comprises a Bragg grating formed in the light pipe. Varasi teaches a Bragg grating (element 3, Figs. 1 and 2A) formed in the light pipe (element 2, Fig. 1). Oraevsky discloses a plurality of pulsed optical sources and/or a multitude of irradiation wavelengths can be used to perform differential measurements and enhance the accuracy of determined glucose concentration (Col 5 lines 1-5). It is known that a Bragg grating used in an optical fiber can be utilized as a tunable filter that transmits all incoming light signal except a narrow band of wavelengths (Col 10 lines 30-47 of Varasi). Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention was made to modify the prism of apparatus (Varasi) to incorporate the Bragg grating (Varasi) in order to more efficient choose particular wavelengths suitable for glucose measurement.

In regard to claim 10, Oraevsky as modified by Varasi discloses the apparatus comprises a Bragg grating formed in the light pipe (Figs. 1 and 2A of Varasi) that receives light from the input aperture and directs the light towards the output aperture (Fig. 1 of Oraevsky and Figs. 1 and 2A of Varasi).

In regard to claim 16, Oraevsky as modified by Varasi discloses the at least one transducer (sensor, fig. 1 of Oraevsky) comprises a Bragg grating formed in the light pipe (Figs. 1 and 2A of Varasi) and a light source (broadband light source, Fig. 1 and Col 8 lines 60-64 of Varasi) that illuminates the Bragg grating and wherein an amount of the illuminating light that exits the Bragg grating is responsive to acoustic energy incident on the output aperture of the light pipe (it is well known in the art that the

detected acoustic energy will be proportional to the incident light intensity, Col 6 lines 12-57 of Oraevsky).

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oraevsky as applied to claim 1 above, and further in view of Clayton et al. (USPN 5,208,886). In regard to claim 17, Oraevsky discloses at least one transducer (Fig. 1) comprises a interferometer (fiberoptic interferometer, Col 6, 30-31) formed in the light pipe (fiberoptic interferometer, Col 6, 30-31) and a light source (laser, Fig. 1) that illuminates the interferometer and wherein an amount of the illuminating light that exits the interferometer is responsive to acoustic energy incident on the output aperture of the light pipe (it is well known in the art that the detected acoustic energy will be proportional to the incident light intensity, Col 6 lines 12-57 of Oraevsky). Oraevsky does not specifically disclose the interferometer is a Fabry-Perot interferometer. Clayton teaches a Fabry-Perot interferometer (Col 4 lines 61-64). Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention was made to substitute the interferometer (Oraevsky) with the Fabry-Perot interferometer (Clayton) to yield predictable results.

11. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Oraevsky and Zimmerman and further in view of Kaneko et al. USPN 5,749,830). In regard to claims 20 and 21, Oraevsky as modified by Zimmerman discloses the optical fiber (Fig. 1 of Oraevsky) receives light from the light source and

directs the received light towards the input aperture (Fig. 1 of Oraevsky). Oraevsky as modified by Zimmerman does not specifically disclose the apparatus comprises a mirror and the light source is controllable to change the direction from which light is incident on the input aperture. Kaneko teaches a mirror (element 61, Fig. 2) and the light source is controllable (controlled by the driver 62, Fig. 2) to change the direction from which light is incident on the input aperture (elements 31a, 61 and 65, Fig. 2). Zimmerman teaches the waveguide (element 16, Fig. 2) is made from any transparent material such as glass or polymer (Col 4 lines 9-10). It is known that when the angle of incident light beams changes, different portions of the microlenses array (element 80, Fig. 2) may receive more light energy and therefore providing more concentrative emitting light on a portion of the microlenses array. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention was made to modify the light source and optical fiber (Oraevsky as modified by Zimmerman) to incorporate the mirror and the controller in order to more efficiently control the illuminating area on the microlenses array.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Vardi et al. (USPN 6,659,957) teaches an optical-acoustic imaging device with the use of an optical fiber, Bragg grating, and a piezoelectric jacket around the fiber for introducing ultrasound impulses (Fig. 4). Teijido et al. (USPN

6,452,872) teaches a device for the oriented illumination of a surface by microprism guide (Fig. 1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHU CHUAN (JJ) LIU whose telephone number is (571)270-5507. The examiner can normally be reached on M-TH 8:00am~4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tse Chen can be reached on (571)272-3672. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Chu Chuan Liu/
Examiner, Art Unit 3777

/Eric F Winakur/
Primary Examiner, Art Unit 3777